The Growth of US Multinationals and Financial Market Development

Susan Feinberg and Gordon Phillips*

Abstract

In this research, we study the resource allocation decisions of US multinational corporations (MNCs). We test predictions about how established MNCs grow across countries and industries over time and the extent to which MNC growth is influenced by country-specific exchange rate or demand shocks and capital market development. Drawing insights from the literature on the domestic growth of conglomerate firms, we make a key contribution in this research by modeling the growth of MNCs as networks of affiliates. Specifically, we examine the extent to which an affiliate, *i*, of a given MNC parent, will grow in response to exchange rate shocks in its own country depends not only upon its own efficiency, but on its efficiency relative to other affiliates of the same MNC parent and the ability of its parent to shift production in response to favorable exchange rate shocks.

We find that MNC affiliate employment growth increases that affiliate's own efficiency, and is also positively related to parent and other affiliate efficiency. We find that local capital market development is particularly beneficial to affiliates that are highly integrated technologically with the rest of the MNC—evidence that the shared resource that stimulates affiliate growth is more likely the kind modeled by Helpman (1984) which can generate positive network effects and be transferred throughout the MNC via intra-firm trade. We also find that increases in law and order benefits MNC affiliate growth.

Comments Welcome
Preliminary
Please do not circulate
First draft: March 21, 2001

* Both authors are from The Robert H. Smith School of Business, University of Maryland. Feinberg can be contacted at (301) 405-2251,email feinberg@glue.umd.edu. Phillips can be contacted at (301) 405-0347, email gphillips@rhsmith.umd.edu respectively. The statistical analysis of firm-level data on US multinational corporations reported in this study was conducted at the International Investment Division, Bureau of Economic Analysis, United States Department of Commerce, under arrangements that maintained legal confidentiality requirements. Views expressed are those of the authors and do not necessarily reflect those of the Department of Commerce. Suggestions and assistance by William Zeile and Raymond Mataloni are gratefully acknowledged.

I. Introduction

Multinational corporations are an increasingly important source of production and employment in industrialized countries (OECD, 1999). Existing research has shown that U.S. multinational corporations (MNCs) have higher accounting profits, higher stock market valuations and higher Tobin's *qs* than firms that only produce and sell domestically.[1] This research has also shown that MNCs have higher advertising and R&D expenditures than other firms. What is unknown about MNCs is how they allocate resources across their networks of affiliates. We also know relatively little about what influences the international growth and operating decisions of established MNCs. Despite the obvious importance of MNCs' resource allocation choices, much research on MNC expansion has focused on primarily on initial investment decisions. Similarly, policy makers have tended to focus more on luring initial foreign investments than on creating environments in which existing MNC subsidiaries can become more globally competitive (Wheeler and Mody, 1992). In addition, we do not know the impact of a country's financial market development nor institutional environment on MNC growth.

In this paper, we examine how MNCs allocate resources across their networks of affiliates. Specifically, we examine how country affiliate employment growth is related to exchange rate and GDP shocks as well as affiliate efficiency and how this relationship varies with the degree of host-country financial market development. Previous empirical research on MNCs has not explicitly accounted for the complex domestic and international linkages in MNC structure in modeling MNC expansion. We test our predictions using disaggregated data from the US Department of Commerce on 12,000 foreign affiliates in 41 countries of 1150 US MNC parent companies.

[1] See Vernon (1971), Dunning (1973), Errunza and Senbet (1981, 1984), Kim and Lin (1986) and Morck and Yeung (1991).

We ask two central questions about MNC resource allocation. First, do MNC affiliates grow together, operating as an integrated network, or do they compete for scarce resources from their parent firms as parents choose to allocate scarce resources based upon affiliates' relative efficiency and exchange rate movements? Two different underlying models of MNC resource allocation motivate this question. First, Helpman (1984) models the MNC as a firm with a scarce resource that can be exploited across multiple countries. In contrast, in the theory of a multiple *industry* firm (conglomerate), developed in a domestic context, firms allocate a scarce resource across multiple markets. Depending on whether the scarce resource faces decreasing returns the model suggests that affiliates will get fewer resources if the MNCs' other divisions are more efficient and receive positive exchange rate or demand shocks. This first question is particularly important in light of recent debates about whether MNCs move jobs and resources away from one country to another because of cost differences or exchange rate movements.

Second, how do MNCs' resource allocation decisions vary over time as countries' financial markets develop? While recent research by LaPorta, Lopez de-Silanes, Shleifer and Vishny (1997) and Demirguc-Kunt and Maksimovic (1998) and Rajan and Zingales (1998) has looked at the impact of financial market development and the legal environment on access to capital by domestic firms, we know little about the impact of financial markets on the growth of established MNC affiliates.

This research examines the resource allocation decisions of US-based MNCs from 1983-1996 across 41 countries and 122 industries. We make a key innovation by drawing upon a well-developed literature on the domestic allocation decisions of conglomerate firms to model the growth of MNCs as networks of affiliates. Since US MNCs are typically diversified across both countries and industries, their resource allocation choices involve a complex optimization problem that takes into account differences in productivity across existing affiliates, the extent to which the

technologies of affiliates are integrated together or with the parent, and country-specific exchange rate and demand shocks.

Using panel data on the entire population of US MNCs – disaggregated at the individual foreign affiliate level for each MNC parent – our research makes three significant contributions. First, we extend previous discrete choice studies of MNC investment decisions by incorporating the complex domestic and international intra-firm linkages underlying MNC behavior. Specifically, we examine whether affiliates with a comparative advantage arising from skill in producing relative to competing affiliates within the same country and industry, and relative to affiliates *within* the same MNC, will have higher production and growth in employment. We also examine the extent to which these relationships differ among affiliates that are more or less integrated technologically within the MNC.

Second, we examine how the growth of MNC affiliates is affected by capital market development and by the quality of legal institutions in the affiliates' countries. We examine whether affiliates' adjustment to demand and exchange rate shocks differs based on the capital market development and legal institutions of the host country. U.S. MNCs have two potential advantages over domestic competitors. They have access to funding through their US parent, which can raise capital in U.S. capital markets, and they also can internalize contracting costs that would otherwise exist between foreign and domestic firms. We expect the former advantage—access to capital markets—to become less important as global capital markets develop.

Third, we examine how changes in capital market development over time affect MNC responses to exchange rate and demand shocks. If one of the advantages of MNCs over domestic producers is access to capital, increases in local capital market development should reduce these advantages and change MNCs' responses to exogenous shocks. Demirguc-Kunt and Maksimovic (1998) and Rajan and Zingales (1998) have shown that capital market development benefits firms' access to external

financing. This increased reliance on external finance has been shown to be related to increased quality of legal and financial institutions. La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) show that countries with poorer investor protection have less developed financial markets.

Understanding how established MNCs allocate resources across global networks of subsidiaries has obvious policy implications. For example, although policy makers tend to focus primarily on luring initial investments, it is important to understand the factors that make a country relatively more attractive for ongoing resource commitments by the MNC. Indeed, one cannot properly predict the expected value to a country of an initial investment without a prediction about how an MNC affiliate will grow over time once the initial investment has been made. For example, there is considerable evidence (Baldwin, 1988; Dixit, 1989) that large exchange rate shocks, although temporary in nature, can cause persistent structural changes in that foreign firms may decide to establish subsidiaries in a country with an undervalued currency. When entry costs are sunk, MNCs will remain in a market even after the exchange rate has appreciated—a frequent explanation for the unprecedented volume of Japanese foreign direct investment in the US during the late-1980s (see Baldwin, 1988). In this example, we know large exchange rate shocks can influence initial investment decisions, but we know relatively little about how exchange rate re-adjustment affects the operating decisions of the MNC once it has established the foreign subsidiary—as part of a global network of subsidiaries. Since established MNCs account for an increasing proportion of output and employment in industrialized economies, it is important to understand how and why they grow.

Our empirical analysis shows that MNC growth is strongly consistent with internalization theory (Buckley and Casson, 1976; Dunning, 1973; Helpman, 1984; Rugman, 1981) and exhibits a positive network effect for resource allocation. We find little evidence of intra-firm trade-offs in MNC resource allocation. Specifically, an affiliate's growth is higher when other affiliate divisions

are more efficient. Similarly, the highest growth affiliates are part of MNCs that have efficient networks of affiliates *overall*. Affiliates with the highest growth also have high-growth parents that are more efficient. Overall, we find that an affiliate's growth and the extent to which it responds to local market conditions is significantly affected by the extent to which it is integrated with other units of the MNC.

We do find some results that are comparable to how domestic conglomerate firms allocate resources across divisions. Our empirical analysis shows that the efficiency of an MNC affiliate, both relative to other same-industry affiliates of a given US parent and relative to other same-industry affiliates in the same country, strongly predicts the affiliate's growth – especially when the affiliate receives a positive exchange rate shock. This result is consistent with Maksimovic and Phillips' (2000) finding that conglomerate firms allocate more resources to divisions with a comparative advantage in production. However, we do not find that *less* resources are allocated to a unit if other units are more efficient. We find affiliates grow more if the other affiliates within the firm are highly efficient – evidence we take as being consistent with Helpman's theory of internalization with increasing or constant returns to scale for firm-specific scarce resources.

We also find that a country's capital market development and growth affects MNC responses to exchange rate shocks. Exchange rate shocks affect affiliate growth significantly more among MNCs in countries with highly developed capital markets. The quality of legal institutions, efficiency and GDP growth are considerably more important determinants of affiliate growth than exchange rate movements in countries with rapidly developing capital markets. It appears that in countries with less developed financial markets, capital market growth and legal institutions facilitate affiliate growth, rather than erode MNCs' advantage of superior access to external financing. GDP and capital market growth may also signal the potential for rapid future development, even if the latter means local competitors will have better access to capital.

The remainder of this paper proceeds as follows. In the next section, we briefly discuss the two models of resource allocation that provide the framework for the empirical analysis in this research. Section III describes the data and econometrics, and Section IV presents the empirical results and discussion. Section V concludes.

II. Theories of MNC Resource Allocation

We begin by describing the two primary models of resource allocation decisions that underlies this research. The first theory we test is Helpman's (1984) theory of internalization with constant- or increasing returns-to-scale for firm-specific resources. In this theory, efficient affiliates facing high demand in their market benefit the other divisions of MNC as these other divisions are part of a network used to help supply the affiliate's demand. The second theory is a theory of comparative advantage applied to the multinational firm. Under this theory, firm's growth depends on the returns-to-scale in their use of the scarce resource. If the resource has diminishing returns MNCs wound face a trade-off. They have to make choices about the affiliates in which to use the scarce resource. Affiliates will get less of the scarce resource if they are less efficient than other divisions.

What is common to both theories is the idea that MNCs are formed because of the existence of firm-specific assets that cannot (or cannot except at a high cost) be licensed or contracted in arms-length transactions to other firms (Buckley and Casson, 1976; Dunning, 1973; Helpman, 1984; Rugman, 1981). However, the theories differ to the extent these assets can be exploited across a network of affiliates. Thus both of these theories are theories of the firm in a multinational context. Certainly at some point the theories must coincide, as one would expect that returns to using the scarce resource will not be increasing over all sizes of production and that there may be some increasing costs to using the scarce resource across multiple industries and countries.

In the remainder of this section, we describe these theories more extensively and provide details of the tests that we conduct in this paper of the patterns of resource allocation across affiliates. We also describe the current theoretical and empirical research that is related to these theories.

A. Internalization with positive network spillovers and MNC resource allocation

Helpman (1984) develops a theory of positive economies of scale for firms that produce differentiated products (i.e., firms that compete in monopolistisically competitive industries). Firms develop firm-specific inputs that can serve multiple plants across multiple countries, and thus there is a gain to multinationality. Errunza and Senbet (1981, 1984) show that MNCs do have a higher stock-market capitalization than matched domestic competitors.

Possible firm-specific scarce resources include resources developed through advertising and R&D. Other scarce resources include access to financial capital. Finally, scarce resources can include organizational and managerial talent. Caves (1982) describes the importance of these types of inputs to the MNC. Kim and Lin (1986) and Morck and Yeung (1991) provide empirical evidence of MNC premiums in the stock market and higher Tobin's *q*s in firms with high amounts of R&D. This evidence is consistent with firm-specific inputs being valued by the market.

This theory would predict that MNCs operate affiliates as a network designed to get maximum benefit out of using firm-specific scarce resources. The overall prediction of this theory is that efficient affiliates will have a positive effect for other MNC affiliates of the parent company. MNCs will not face as high a trade-off in allocating resources across affiliates, as they will have constant or only slightly decreasing returns to scale. The empirical prediction is that efficient affiliates will grow more and get more resources when they experience positive demand shocks in their local markets and other affiliates in their network are also more efficient.

The type of scarce resource that constitutes the firm-specific input for MNCs has implications for the impact of positive demand and exchange rate shocks on firm growth. Scarce resources

developed through R&D and advertising along with superior access to financial capital do not face the same increasing organizational costs as resources such as managerial talent.

We thus expect positive network effects for MNCs to be greater for firms with high R&D and increased access (relative to domestic competition) to financial markets. We expect the advantage of superior access to financial capital to have more of an impact if domestic competitors of the MNC affiliates are in markets that are less developed financially.

B. Comparative Advantage, Scarce Resources and MNC resource allocation

The second theory is based on scarce resources with decreasing returns-to-scale across some markets. The extent of decreasing returns depends on the relatedness of markets. If markets are related or firms vertically integrated, we would not expect to see decreasing returns. This theory, which we term the comparative advantage theory, has been developed for the case of domestic conglomerate firms operating in multiple markets by Maksimovic and Phillips (1998). Maksimovic and Phillips (1998) extend work by Coase (1937) and Lucas (1978) to a multiple industry setting. This theory is based on the scarce firm-specific resource being organizational talent that faces decreasing returns to scale as firms expand and grow larger across markets that are not related. As described by Lucas (1978) and Williamson (1982), organizations may face increasing costs of supervision and management as they grow larger. These increasing administrative costs thus put a bound on firm size. Firms, and specifically MNCs, would be predicted to expand first in their highest-return, highest-skill market and then move into other markets to use their scarce resource as returns in the primary market(s) diminish.

To the extent that firms are highly skilled and those skills transfer to a related market, the firm would be able to expand in these markets without the same decreasing returns. In the context of a multinational firm, if the MNC is integrated across multiple markets, it would be able to expand across multiple markets if the MNC is efficient, when markets experience positive shocks. The, the

optimal number and size of industry segments a firm operates depends on its comparative advantage across industries and the extent of integration or transferable skills across markets.

The basic comparative advantage theory with scarce resources yields relevant predictions for the growth of MNC affiliates in several regards. First, and most importantly, it takes into account the idea that firms with multiple units or divisions (or, in this case, foreign affiliates) consider the competitiveness of their nexus of segments when making resource allocation decisions for an individual segment. Second, the notion that comparative advantage - both within the firm and relative to external competitors in the same industry - explains the growth of individual segments is also a reasonable framework to apply to MNC growth.

A key prediction of the this model relevant for studying MNC growth is that the effect of demand shocks on affiliate growth varies with the efficiency of the affiliate and the demand shock received by that affiliate versus other affiliates in the MNC network. If MNCs have scarce resources, an affiliate will grow *less* (*more)* if other affiliates of the same firm are *more* (less) efficient and experience a positive demand shock. There is thus a trade-off across affiliates within a MNC. However to the extent the MNC is integrated across multiple markets, this trade-off would not occur (or would be mitigated). In this case a firm would grow more (less) in a specific market if the other affiliates are more (less) productive and experience a positive demand shock.

Given we are studying firms in an international context, demand shocks can take two forms: local shocks to country GDP and shocks to international competitiveness from changes in real exchange rates. To examine how international shocks affect MNC resource allocation across their networks, we examine the interaction between the efficiency of affiliate *i* and its exchange rate shock. We predict that the growth of an MNC affiliate in a country that is experiencing a positive exchange rate shock (a real depreciation) will depend upon the relative efficiency of that affiliate. We predict that more efficient affiliates will be better positioned to exploit changing country

conditions that favor growth. We also expect that larger MNCs will be better positioned to exploit changing country conditions across networks of affiliates. The comparative advantage theory would also predict that larger MNCs with more extensive networks of affiliates are more likely to be able to shift production out of and into affiliates with similar technological configurations. MNCs with fewer affiliates may be more constrained in their ability to make such adjustments in response to positive exchange rate or demand shocks.

For MNCs, the resource allocation decision involves an additional consideration not faced by firms that operate solely within a country. Namely, some MNCs expand abroad to segment domestic and/or global production more efficiently. For example, a plant in Malaysia might make a specific input needed by the US MNC parent or another MNC affiliate in France. Under such a scenario, an affiliate that is more technologically integrated with other units of the same MNC (either other affiliates or the US parent), should be relatively less affected by its own country shocks. Affiliates which produce primarily for local markets (and use relatively few imported inputs) should be less affected by exchange rate shocks and more affected by local market demand shocks.

Holding intra-firm integration and relative efficiency constant, we examine the extent to which MNCs allocate additional (fewer) resources to import- (export-) intensive affiliates in countries that experience exchange rate or demand shocks. Affiliates that rely heavily on imported inputs to serve local markets should grow relative to affiliates with more local value-added when the local currency undergoes a real appreciation. Export-intensive affiliates will be disadvantaged by a real appreciation of the local currency but relatively unaffected by changes in local market demand.

Finally, we focus on how changes in the development of local capital markets affect our predictions on efficient resource allocation. In particular, access to financial capital is considered to be an important advantage to MNCs. Fazarri, Hubbard and Petersen (1988) consider how costly

external finance by different types of firms in the US may limit their growth. In an international context this problem may be more severe as foreign firms without well-developed capital markets may have difficulty raising capital. We therefore expect that *ceteris paribus*, MNCs will grow more in response to positive exchange rate and demand shocks in countries with less developed capital markets. We expect this relationship to become attenuated as local capital markets develop, since MNCs' comparative advantage in access to capital should become less important.

III Methods

A. Data

The data set used in this paper is from the Benchmark and Annual Surveys of US Direct Investment Abroad administered by the Bureau of Economic Analysis, United States Department of Commerce. These surveys are the most comprehensive data available on the activities of US-based MNCs and their foreign affiliates. For this study, we use the BEA data disaggregated at the individual foreign affiliate level for each MNC from 1983-1996. The BEA data includes foreign affiliates located in more than 130 countries, and reporting sales in more than 120 2-3 digit industry codes. Affiliate data can also be linked to data on the US parents. We use data on both affiliates and parents in this study.

We made several alterations to the BEA population to construct the panel used in this research. First, because the BEA conducts two different surveys - the Benchmark and Annual Surveys - with different reporting requirements in terms of affiliate size, reported data are not available for all the affiliates throughout the 14-year period. In particular, the Benchmark Surveys, conducted in 1977, 1982 and 1989 and 1994 include the whole population of MNCs and their foreign affiliates, and smaller affiliates are required to report. But, in the Annual Surveys, many of the small affiliates that report data in the 1989 and 1994 Benchmark Surveys, are exempt from filing. In cases where affiliates report data in a Benchmark Survey but are exempt from the Annual Surveys, the BEA

carries them forward by estimating data.[2] As a result of this sampling procedure, many of the observations for smaller affiliates were estimated for most of the 14-year period. In an initial screen, we removed all estimated data from our sample. After this screen, our panel contained approximately 155,000 affiliate-year observations out of a population of 256,000.

A second screen involved keeping only affiliates in countries for which we had real exchange rate data. Approximately 18,800 observations were dropped in this screen, but our remaining sample of 137,000 affiliate-year observations account for 95% of total affiliate sales (among affiliates that report data). In other words, the affiliates that report data in countries dropped from our sample in this step are relatively small.

Finally, because our dependent variable is specified as a change and because we use lagged independent variables, we removed affiliates with missing data and/or non-consecutive observations from our sample. This screen resulted in the removal of a large number of affiliate-year observations, as many affiliates had only one or two non-consecutive reported data points (one for each Benchmark year – 1989 and 1994). Our final regression sample includes 51,198 affiliate-year observations on 12,017 affiliates of 1152 US parents. The median number of affiliates per US parent is 22.

B. Variables

The dependent variable, $Empchg_{ijcp_{t-(t-1)}}$ is the log change in employment of affiliate i in industry j in country c of US MNC parent, p, from time $(t\text{-}1)$ to t. We use a log change to mitigate heteroskedasticity, as the number of employees (and change in employment) varies considerably in the sample of affiliates. We use employment change as a measure of growth since it is the only

[2] Note that the individual affiliates which are carried forward are small and are thus are not likely to have a significant impact on the BEA's published data at the industry or country level.

local country input variable we observe directly.[3] We use the following independent variables in our basic specification (all of which are summarized in Table 1)[4]. In addition to the following variables, we control for affiliate size using log sales at time *t-1*. We control for time using a trend, and we include country fixed effects in our models.

Insert Table 1 here

B1. Efficiency of Affiliates and Parent Divisions:

We calculate four measures of efficiency, three for the affiliates and the fourth for the MNC parent. The first measure of efficiency is within-MNC efficiency. This variable measures efficiency relative to other affiliates in the same MNC in a particular year for a given industry. Our specific measure of affiliate *i*'s efficiency is [(Affiliate Sales – Cost of Goods Sold (CGS))/affiliate employment][5] at time *(t-1)*. Because we predict that MNCs will allocate resources to affiliates with a comparative advantage *within the MNC,* we construct a relative efficiency variable by subtracting from affiliate *i*'s efficiency the average efficiency of all the affiliates of the same parent and in the same industry as affiliate *i*. We expect that affiliates which are relatively more efficient within the MNC (compared with other same-industry affiliates) will have higher growth.

Our second measure of efficiency is affiliate efficiency versus other MNC affiliates in that same industry within the same country. We construct this measure by subtracting from affiliate *i*'s efficiency the average efficiency of unrelated MNC affiliates in the same country and industry as affiliate *i*. We expect that MNCs will allocate more resources to affiliates which are relatively competitive (compared with other same-industry affiliates) within a given host country.

[3] Other potential measures of growth, such as sales growth or change in some measure of capital stock are problematic for two reasons. First, all the affiliate data is reported in US dollars and other growth measures are sensitive to exchange rates. Second, growth measures such as sales are measures of quantities times prices and are sensitive to cross-country price differences in addition to exchange rates.

[4] All variables in dollars are normalized to 1982 US dollars using industry-specific deflators from the Bureau of Labor Statistics.

[5] For robustness, we used 3 different measures of affiliate efficiency in addition to the one discussed here (we do not report results using the other measures, but they are available upon request from the authors). The alternative measures showed no systematic differences from the measure we use here. The other measures were [(affiliate sales – employee compensation)/affiliate employment, and both the above measures were also divided by sales, rather than employment as the third and fourth measures.

We expect that affiliates of MNCs that are more efficient throughout their global network will experience higher growth. We therefore include as a third measure of efficiency the weighted average efficiency measure of all the other affiliates of a given MNC parent. To construct this measure, we sum together (efficiency*sales) for all other affiliates of a given parent, *p*, and divide by the total sales of all the affiliates of parent *p*. Holding affiliate *i*'s own efficiency constant, we expect that affiliate *i* will grow more if the other affiliates of the same parent are more efficient.

Our final measure of efficiency is for the U.S. parent. We expect that affiliates of more efficient US parents will experience higher growth. We measure parent *p*'s efficiency by (sales – employee compensation)/employment (at time *(t-1)*), and we industry-adjust this measure by subtracting from parent *p*'s efficiency the mean efficiency of all US parents in the same industry-year.

B2. Exchange Rate and GDP Shocks

We measure the exchange rate shock in country *c* as the log change in the real trade-weighted CPI-based exchange rate from time *(t-1)* to *t*.[6] Although affiliate growth should be negatively related to the real exchange rate shock (since a real depreciation in country *c* lowers relative production costs), we expect that growth will depend on the interaction between affiliate efficiency and the sign of the exchange rate shock in country *c*. We do not predict a significant main effect for the exchange rate shock in country *c*, because if an affiliate has been established to produce and sell goods for a local market (and it performs all or most of its value-added activities locally), a change in the exchange rate in country *c* should have little or no effect on the activities of the affiliate. Indeed, we expect that only MNCs with large, established networks of productive affiliates will have the ability to move production globally such that they can take advantage of temporary exchange rate movements that lower production costs. Therefore, we expect affiliate growth in response to exchange rate shocks will also depend upon the extent to which the affiliate is integrated technologically with the MNC. The measurement and predictions on the interaction terms in our model is discussed below.

[6] We are grateful to Anthony Turner of the IMF for providing us with real exchange rate data. More information on the construction of the real exchange rate series used here can be found in Tuner and Golub (1997). We also ran the regressions using a real unit-labor based real exchange rate series (also from Tuner and Golub). The results (not reported here) did not differ from those obtained using the CPI-based real rate, and the CPI-based rate is a longer series.

We include two measures of GDP growth: a one-period shock (measured as the log change in country *c*'s real GDP from time *(t-1)* to *t*) and long-run GDP growth (measured as the log change in real GDP from time *(t-5)* to time *t*. Holding affiliate efficiency constant, we expect that demand growth in country *c* will be positively associated with affiliate growth. We expect that an affiliate's response to GDP growth in its host country will depend upon the extent to which it is integrated technologically within the MNC. Specifically, affiliates that export a larger share of their sales to other divisions of the MNC should be less sensitive to local market conditions. We examine this prediction in the models estimated in Table 4.

B3. Country Financial Markets and Legal Development

We use two variables to proxy for the level of a country's capital market development.[7] We use the size of the capital markets at the end of the year divided by per-capita GDP. We also use a turnover ratio to capture the market activity. The turnover ratio is calculated as the total value of shares traded during the year divided by the total size of the capital markets. We multiply this turnover ratio by the number of domestic companies traded to get an aggregate measure of market activity. If capital market development reduces the advantage of access to capital markets for the MNC, we would expect MNCs to have higher growth rates in response to positive GDP and exchange rate shocks in less developed markets. However, if these markets also have the highest long-term growth prospects, we might expect the opposite finding, namely, a larger response to exogenous shocks in less developed markets. To examine the difference between these explanations, we look at the change in the development of capital markets over a 12-year period. We calculate the change in market capitalization from the average of the 1983-1986 period to the average of the 1993-1996 period. If MNCs are focusing on long-term development of markets, we expect that higher growth rates in development may be associated with higher growth rates of MNC affiliates – as these markets become more and more attractive to all firms.

Following La Porta et. al. (1997) and Demirguc-Kunt and Maksimovic (1998) we examine the impact of legal institutions combined with financial market development by including a measure of *law and order*. To get a panel we use the variable "law and order tradition" from IRIS Time-Series of International Country Risk Guide Data, which is available for 1982-95.[8] Specifically, we

[7] These variables are constructed using data from the IMF International Financial Statistics Yearbook, and the Annual IFC Emerging Stock Markets Factbook.
[8] This data was first used in Clague, Keefer, Knack and Olson (1996).

examine the impact of financial market development for countries with high vs. low indices of law and order. If law and order tradition is important for MNCs' resource allocation decisions, we expect higher growth in countries as law and order traditions improve.

B4. Variable Interactions

We include interactions between affiliate efficiency and exogenous shocks to test our main predictions. First, as discussed above, we predict that the growth of affiliate *i* in response to exchange rate shocks in country *c* will depend not only upon its own efficiency, but on the size of the MNC to which affiliate *i* belongs. Larger MNCs with a greater number of affiliates should be better positioned to shift production out of and into affiliates with similar production technologies. We therefore expect that the interaction between a favorable **exchange rate shock (a real depreciation)*affiliate *i*'s efficiency*the number of affiliates belonging to affiliate *i*'s parent** should be negatively related to affiliate *i*'s growth. We expect a negative relationship because the sign of a "favorable" exchange rate shock is negative and more productive affiliates have positive efficiency. The number of affiliates belonging to affiliate *i*'s parent is always a positive number.

The other two interactions in our specifications are between affiliate *i*'s exchange rate shock and the extent to which it is integrated technologically with the MNC. We measure MNC integration as the ratio of affiliate *i*'s exports to (imports from) other divisions of the MNC divided by affiliate *i*'s total sales. We have two sets of predictions regarding affiliate *i*'s integration with the MNC in general, and the interaction between affiliate *i*'s integration with the MNC and its exchange rate shock. First, the effect of exchange rate shocks on affiliate *i*'s growth depends on the interaction between affiliate *i*'s import and export integration with the MNC and the sign of its exchange rate shock. Specifically, affiliates that export a larger portion of their sales should grow more in response to a favorable exchange rate shock (since exports become cheaper). Similarly, affiliates that import a relatively large share of their local value-added should be disadvantaged by a real depreciation of the local currency. We do not expect these effects to be equally large, however. First, the measure of MNC import-integration includes only imports from the US parent, whereas the measure of MNC export-integration includes exports to US parents and affiliate *i*'s exports to other-country affiliates of the same parent. Second, import and export integration may also involve different levels of sunk costs in technological configuration. For example, on the import side, goods are coming from the US parent to a foreign affiliate, and parent production, because of the larger size and greater scope of the parents relative to the affiliates, is likely to have higher sunk costs and

be less easily adapted to changing market conditions than affiliate production. Conversely, because the average parent in our sample has more than 20 affiliates in a given year, it may be easier to reconfigure affiliate production to export relatively more when there is a favorable exchange rate shock. We expect that the sign of the **MNC export integration*exchange rate shock** will be negative and significantly related to affiliate growth. We expect that the **MNC import integration*exchange rate shock** interaction will be positive (import-intensive affiliates will contract in response to a real depreciation), but will exert a weaker influence on growth.

We have a second set of predictions regarding MNC integration, which we examine by dividing the sample of affiliates into quartiles based upon integration ratios (presented in Table 3). Specifically, affiliates that are more integrated with the MNC should be less affected by local market conditions. We therefore expect GDP shocks to have a greater effect, and exchange rate shocks to have a smaller effect on the growth of affiliates the produce primarily in and for local markets.

C. Estimation

We estimate the following regression model:

$$Y_{i(t-(t-1))} = \beta_o + \beta_1 X_{i(t-1)} + \beta_2 Z_{i(t-(t-1))} + C_i + \tau_t + \nu_{it} \qquad i=1,2,...N;\ t = 1,2,...14 \qquad (1)$$

where $Y_{i(t-(t-1))}$ is the log change in employment of affiliate *i*. $X_{i(t-1)}$ is a matrix of lagged firm-specific variables and interactions including two measures of affiliate *i*'s efficiency (one relative to affiliate *i*'s MNC-industry, the other relative to affiliate *i*'s country-industry), the efficiency of other affiliates in affiliate *i*'s network, affiliate *i*'s efficiency interacted with its exchange rate shock and the number of affiliates in its network, affiliate *i*'s exchange rate shock interacted with its MNC import-integration and MNC export integration, and affiliate *i*'s log sales. $Z_{i(t-(t-1))}$ is a matrix of country variables including a one- and five-period GDP shock and the exchange rate shock. C_i is a vector of country dummies and τ_t is a time trend.

ν_{it} is the error term, which consists of two components: $\nu_{it} = u_i + \varepsilon_{it}$, where $u_i \sim N(0, \sigma^2_u)$ is a vector of unobserved time-invariant affiliate-specific characteristics which are i.i.d. over time and across firms, while ε_{it} is assumed to vary over time and across firms.

We estimate (1) using a GLS (random effects) estimator. We use GLS rather than fixed effects to include time-invariant country effects in our model. As a basic robustness check of our random effects estimator (not shown here), we dropped the country dummies, included year dummies and estimated (1) using both fixed and random effects. A Hausman test showed no significant difference between the fixed and random effects estimators. The results of our regression models are reported in Tables 1-3 and will be discussed in detail in the next section.

IV. Results

A. Sample Summary Characteristics

Tables 1 and 2 present summary statistics for the firms in our dataset. Table 2 breaks out the statistics by affiliate growth quartile. Affiliate growth is measured by the log change in affiliate employment from time *(t-1)* to *t*, averaged by affiliate to define the quartiles. The last column of Table 2 gives t-statistics for differences in means between quartiles 1 and 4.

Table 2 shows that average affiliate efficiency (by MNC-industry and by country-industry) increases significantly from the lowest to the highest affiliate growth quartiles. This strong positive relationship between efficiency and growth is a fundamental prediction in this research that we examine in our regression models. Other affiliate efficiency also increases significantly from the lowest to the highest growth quartiles. Interestingly, the highest growth affiliates are not the largest affiliates—measured by either sales or employment. Specifically, the largest affiliates on average are in the next-to-lowest growth quartile. Affiliates in the highest growth quartile have

approximately the same number of employees and have sales averaging only 65% of affiliate sales in the lowest growth quartile.

Insert Table 2 here

Four more relationships in Table 2 are noteworthy. First, the highest growth affiliates also have very large parents (although parents of affiliates in the lowest growth quartile are slightly larger on average). Second, and more importantly, the highest growth affiliates also have the highest growth parents. Indeed, average parent growth increases across all four affiliate growth quartiles. While we do not examine this relationship directly in our regressions (since including parent growth as an explanatory variable in reduced-form model of affiliate growth would be problematic). However, this result is noteworthy in that it is inconsistent with the notion that the international expansion of US firms comes at the expense of domestic jobs. Two possible explanations for this result (also in Table 2) are, first, that parent efficiency also increases significantly across the affiliate growth quartiles. From Table 2, it appears that growing MNCs are more efficient throughout the global network—including the US parent—and this efficiency enables the MNC to grow multiple divisions simultaneously. Second, parent R&D is also significantly higher among affiliates in the highest growth quartile. This relationship is consistent with the notion that firm-specific resources stemming from high R&D are less likely to be of the diminishing-returns type.

B. Growth of US MNCs

We present our empirical results in three sections. In this section, we examine our main predictions summarized in Table 1. First, we test whether affiliates that are more efficient, both relative to other same-industry affiliates in the MNC and other same-industry affiliates operating in the same country, have higher growth. Second, we examine the effect of exchange rate and demand

shocks on affiliate growth. We predict a positive effect of demand shocks on growth (holding efficiency constant), and a significant exchange rate effect – moderated by the affiliate's efficiency and the size of the MNC. Third, we also predict significant exchange rate effects for technologically integrated affiliates that import and export higher shares of their total output from the MNC.

Insert Table 3A here

Table 3A shows our main findings for the full sample of affiliates. As expected, there is a strong positive association between the growth and efficiency of MNC affiliates. Not only do more efficient affiliates grow significantly more, but affiliates from MNCs with more efficient networks of affiliates (holding affiliate *i*'s own efficiency constant) also have significantly higher growth. From these results, it appears that there is a skill to operating foreign affiliates that is associated with higher growth globally – including in the home country. Moreover, the significant positive relationship between other affiliate efficiency and affiliate *i*'s growth implies that affiliates within an MNC appear to grow together as integrated networks, rather than compete among each other for scarce resources from the parent. If the latter model of growth were true, we would expect the efficiency of other affiliates to be negatively related to the growth of affiliate *i*. Rather, affiliate *i*'s growth is reinforced by its own efficiency (both relative to other affiliates within the MNC-industry and relative to competitors within its country-industry) and the efficiency of other affiliates in its network. We also find a strong positive association between affiliate growth and US parent efficiency. This finding also reinforces a network pattern of MNC growth, rather than a pattern in which more efficient MNC units (including the US parent) grow at each others' expense.

Also consistent with our predictions, there is no significant main effect for the exchange rate shock. However, we find that more efficient affiliates from larger MNC networks have higher

growth in response to favorable exchange rate movements. US parents with large networks of affiliates can shift production in response to changing market conditions throughout the global network. A larger network of affiliates increases the likelihood of technological similarity between several affiliates, facilitating production shifts.

Local market growth – both short and long run – has a significant positive association with affiliate growth. Since many affiliates produce a large portion of their output in and for local markets, the significant relationship between affiliate growth and host-country GDP growth is not surprising.

Since many affiliates are also integrated technologically within the MNC (both exporting to- and importing from other MNC divisions), we expected the interaction of the exchange rate shock and affiliate *i*'s MNC import and export integration would be significantly associated with affiliate growth. This prediction was supported for the affiliate export integration*exchange rate shock interaction but not the import integration*exchange rate shock interaction. As we mentioned earlier, we expected a weaker result for the latter, as import integration involves production shifts by the US parent – a potentially more complex and costly operation.

Insert Table 3B here

Table 3B examines the growth in employment of the parent firm's U.S. operations. We use a similar specification to the affiliate growth model (however, we omit country fixed effects). Specifically, we examine the how growth in U.S. parent employment varies in response to both affiliate and parent efficiency, as well as U.S. demand and exchange rate shocks. One key policy implication that this specification allows us to examine is whether U.S. MNCs move employment abroad as MNC affiliates become more efficient.

The most striking finding of Table 3B is the finding that U.S. employment growth is positively related to both U.S. and affiliate efficiency. This result shows that U.S. MNC employment rises with the efficiency of the global network of foreign affiliates. There is no support for the proposition that U.S. parent firms cut U.S. jobs when affiliates are cost efficient. We do find support for U.S. MNC employment growth being positively related to parent R&D. This finding supports the proposition that MNCs are networks that can effectively leverage a scarce resource. Finally we find strong evidence that U.S. MNC parent divisions respond to exchange rates. For MNCs that import a large fraction of their sales from foreign affiliates, a real appreciation (depreciation) of the U.S. exchange rate increases (decreases) U.S. based employment for the parent MNC.

C. MNC Growth as Networks

Table 4 examines the relationship between affiliate technological integration within the MNC and affiliate growth. We estimate six regression models in Table 4: models 1 and 2 split the sample of affiliates into high and low MNC export intensity (defined by the 50^{th} percentile of MNC export integration). Models 3 and 4 split the sample into high and low MNC import intensity, and models 5 and 6 split the sample into high and low import *and* export intensity.

Insert Table 4 here

Affiliates vary considerably in the degree to which they are integrated within the MNC. The average affiliate imports and exports approximately 8% of total sales to and from other divisions of the MNC. Recall our basic predictions for MNC import and export intensity. Regarding export intensity, we expected that export-integrated affiliates would be more affected by exchange rate shocks and less affected by local demand shocks.

The predictions for import-intensive affiliates are somewhat less straightforward. For example, the sign of a "favorable" exchange rate shock for import intensive affiliates is positive—not negative. Input costs for import-integrated affiliates drop when the local currency appreciates. However, again, because import integration of affiliates requires production by the parents, import-intensive affiliates may be less sensitive generally to exchange rate movements. Local demand should be important for both low and high import-integrated affiliates, since many of the former import finished and intermediate goods from the parent to resell in the local market.

Models 1 and 2 in Table 4 shows support for our predictions for high- and low- export-integrated affiliates. Short and long-run GDP growth in the host country have a significant influence on the growth of affiliates in both sub-samples. However, the differences between the coefficients on GDP growth in the high- and low-export sub-samples is not statistically significant. Not surprisingly, the import- and export*exchange rate interactions are insignificant in the estimates for the low export-integration sub-sample and significant in the high-export-integration sub-sample. However, because of the relatively large standard errors, a test for significant differences in the parameter estimates for these variables in the two subsamples is insignificant. Interestingly, the sign of the import-integration*exchange rate shock in the high export-integration sub-sample is opposite to the predicted direction. Affiliates that export a significant portion of their output to other MNC divisions grow less if they are also import-intensive and experience a real appreciation of their local currency. Finally, as expected, in the high-export-integration sub-sample, more efficient affiliates from larger MNC networks have higher growth in response to favorable exchange rate movements. This result is insignificant in the low-export-integration sub-sample.

Apart from the differences in the two subsamples, the results for the export-integration splits are quite similar to the results for the full sample. Affiliate efficiency (both measures) and other affiliate efficiency have a significant positive association with affiliate growth.

Models 3 and 4 in Table 4 show support for our predictions for high- and low-import-integrated affiliates, although the growth of affiliates in these two subsamples differs in interesting ways. For example, the effect of the one-period GDP shock differs in the high- and low-import integrated affiliates. Indeed, the one-period GDP shock has a significant impact on the growth of high-import-integrated affiliates, but not low-import integrated affiliates. This result implies that when foreign markets expand, both affiliates in the foreign markets and their US parents companies grow. Since the parent companies are selling inputs to affiliates in the high-import-integrated subsample, and these affiliates are significantly affected by local growth, US parents are also likely expanding production to source their foreign affiliates. No growth trade-offs are evident from these results. The growth of foreign affiliates in growing markets should generate growth of U.S. parents that supply these affiliates.

Other affiliate efficiency is also significant and positively associated with the growth of affiliates in the high import-intensity sub-sample but insignificant in the low-import-integration sub-sample. It may be that affiliates that import relatively more from US parents are also importing more from other foreign affiliates in the MNC network. Unfortunately, as discussed earlier, we do not observe affiliate *i*'s imports from other MNC affiliates – we only observe affiliate *i*'s exports to other affiliates. We therefore cannot examine this result more closely in the present context.

Finally, the efficiency variables have unexpectedly different effects on high- and low- import integrated affiliates. Specifically, within-MNC efficiency has a stronger positive effect on low-import integrated affiliates, but within-country efficiency has a stronger positive effect on the high-import integrated affiliates. Moreover, the efficiency*exchange rate shock*MNC size interaction is insignificant in the low-import integration subsample (but a test for differences in the betas is not significant).

It appears that MNCs configure import-integrated affiliates somewhat differently from export-integrated affiliates, although a more detailed examination of these results will be undertaken in future research. In both groups, however, network patterns of resource allocation seem to dominate, as the efficiency of other affiliates in the MNC group is always positively associated with affiliate growth.

Models 5 and 6 in Table 4 contrast the growth of affiliates with high and low ratios of *both* import and export integration. As expected, affiliates that sell more of their output to other divisions of the MNC are more sensitive to exchange rate shocks. The export-intensity*exchange rate shock interaction is significant in the high-integration sub-sample, but not the low-integration sub-sample. Interestingly, all the variables relating to the efficiency of other MNC units or to the size of the MNC are only significantly associated with the growth of affiliates in the high-integration group. Contrary to expectations, however, local GDP shocks are significantly associated with affiliate growth in both sub-samples. (Indeed, the one-period shock is significant only in the high-integration sub-sample). It appears that integrated affiliates may benefit more from network efficiency, but are still affected by local market shocks.

Overall, integrated MNCs appear better positioned to grow internationally, as the growth of highly integrated affiliates increases with greater MNC network efficiency. For all groups of affiliates, the efficiency of affiliate *i*'s US parent is strongly associated with affiliate *i*'s local growth.

D. MNC Growth and Financial Market Development

We next examine how country financial markets affect the previous results for MNC growth and export/import intensity. As discussed in previous sections, financial capital is a scarce resource that limits the growth of firms in general. However, for MNCs, superior access to financial capital is considered to be a key advantage over domestic competitors – particularly in

markets that are less developed financially. In Table 5, we include a measure of capital market development to the previous specification of Table 4 (Models 5 and 6). Specifically we examine the effect of market turnover multiplied by the number of companies traded.[9] This measure captures both the intensity of trading and the size of the financial markets. We include the turnover measure as many markets are subject to infrequent trading of their listed companies.

Insert Table 5 here

Table 5 shows that stock market development is positively correlated with the growth of MNC affiliates that have high export and import intensity. This finding is perhaps somewhat striking if one views the development of financial markets as providing competition to the MNC. When local capital markets are more developed, local firms have increased access to external capital, so MNCs' relative advantage in financing is reduced. Note, however, that only the growth of integrated affiliates is positively related to stock market development. Because integrated affiliates are, by definition, transferring more of their output to the MNC network (and purchasing more of their inputs from their US parents), they are likely benefiting from positive network effects which are embodied in their intra-firm trade. Such effects appear to give these affiliates an advantage—despite the potential disadvantage of increased local firm access to capital.

What is also very interesting is the fact that MNC employment is still also strongly influenced by the efficiency of the MNCs' other affiliates – particularly for those affiliates with high export and import intensity. These findings are consistent with the presence of a firm-specific shared input which can be exploited throughout the network.

[9] Similar results obtained when we just included stock market turnover by itself.

E. MNC Growth and the Law and Order Tradition

We examine further how financial market development affects MNC affiliate growth by splitting our sample into two based on stock market capitalization divided by GDP. In addition, we focus on the effect of a country's law and order tradition on MNC affiliate growth. We include a variable for law and order tradition because, as demonstrated by Demirguc-Kunt and Maksimovic (1998) La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) (LLSV), domestic firms in countries with a higher law and order tradition have the ability to raise more external finance. Our measure of the law-and order tradition is yearly measure from the IRIS data. If the advantage of MNCs is purely financial, better quality access to external finance by domestic competition would erode MNCs' advantage and reduce the growth of affiliates.

Insert Tables 6 and 7 here

Our results show, perhaps surprisingly, that an increase in the law and order tradition within the low stock market capitalization countries actually has a positive effect on MNC affiliate growth. This result, along with the findings in the previous section on MNC growth and financial market development, provide strong evidence that MNC's advantage in raising external financing is not the primary reason for affiliate growth.

The increase in law and order within these low stock market capitalization countries thus seems to benefit MNC affiliates in those countries – indirect evidence of lower costs of contracting and doing business within those countries as these countries develop. Combined with the findings by LLSV and Demirguc-Kunt and Maksimovic, which show the benefits to domestic firms of a strong legal environment, this evidence shows an even stronger benefit of an increase in the law and order tradition on employment in these countries.

In Table 7, we split our countries into two quartiles based on law and order tradition to show the effect of capital markets conditional on law and order. The results show that there is still a strong positive effect of higher stock market development on affiliate employment growth in countries with both a low and high law and order tradition. Greater potential competition, proxied by the stock market turnover times the number of companies traded, does not cause MNCs to reduce employment. On the contrary, greater financial market development may signal the future attractiveness of those markets evidenced by increases in the number of domestic firms and increased stock market turnover.

F. Dynamic Effects: The Effect of an Increase in Capital Market Development over Time

In this section, we further expand our analysis by considering the effects of changes in capital market development over time. We test the proposition that as capital markets develop the advantage of MNCs diminishes and thus MNC affiliate growth should decline in countries with large positive changes in capital market development.

Table 8 presents regression results for changes in stock market capitalization. We examine affiliate growth in countries with high capital market growth and low initial capital market development, and low capital market growth and high initial capital market development. We created these splits using the initial stock market development and the subsequent change in stock market capitalization/GDP over a 12 year period (the beginning level and the growth).

Insert Table 8 here

Several interesting results are evident in the two sets of results. First, the growth of MNC affiliates is still strongly influenced by both efficiency and exchange rate shocks. Second, exchange rate shocks seem to matter less to affiliate growth developing capital market countries than local

GDP growth. Indeed, the efficiency*exchange rate shock*MNC size interaction is insignificant in the high capital market growth subsample and highly significant in the low capital market growth subsample (although a test for significant differences in the betas was not significant). This result is somewhat surprising given that we had expected MNCs to grow more in response to positive shocks in countries with relatively undeveloped capital markets. Since MNCs have the financial resources to exploit currency shocks, we expected a greater growth response. The estimates of the two GDP-growth variables differ in the two sub-samples. Specifically, the one-period GDP shock is significantly associated with affiliate growth in the low-growth-high-initial-development sub-sample, and insignificant in the high-growth-low-initial development sub-sample. The reverse is true for long-run GDP growth, which has a significantly greater impact on affiliate growth in the high-growth-low-initial-development sub-sample.

Finally, relative country-industry efficiency has a significantly larger impact on the growth of affiliates in high-growth-low-initial capital market-development countries.[10] It may be the case that since there is more market risk in these countries, MNCs pay closer attention to the productivity of these affiliates relative to external competitors in the same country than to the productivity of their affiliates relative to within MNC affiliates in more developed markets. An efficient network of affiliates likely generates more revenue to subsidize affiliate operations in countries where internal financing by the MNC is desirable. Similarly, greater overall efficiency of the affiliate network (combined with greater relative within-country competitiveness of affiliates in developing capital market countries) can serve as a hedge against market risk.

[10] Note that we control for country fixed effects and time, so factors such as country risk – to the extent that they remain relatively constant—are controlled for with the country fixed effects.

V. Conclusions

In this paper, we examine MNC resource allocation. Our results suggest that MNCs possess scarce resources that can be exploited across multiple countries with few trade-offs to growth among affiliates in an MNC network. Accordingly, efficient affiliates facing high demand in their markets benefit other divisions of the MNC (including the US parent), as these other divisions are part of a network used to help supply the affiliates' demand. These findings imply that fears about the expansion of US MNCs causing domestic job destruction appear to be misguided.

Our results for MNC growth and financial market development provide evidence for the kind of resources that create advantages for MNCs. Since superior access to financial capital is considered a key advantage of multinationals, increases in local capital market development might be expected to erode this advantage. However, we find that host country financial market development and growth has a positive impact on the growth of MNC affiliates. Thus we show MNC affiliates also benefit from increases in financial market development – in addition to the benefits that previous research has documented for domestic firms. Indeed, local capital market development is particularly beneficial to affiliates that are highly integrated technologically with the rest of the MNC—evidence that the shared resource that stimulates affiliate growth is more likely the kind modeled by Helpman (1984) which can generate positive network effects and be transferred throughout the MNC via intra-firm trade.

Finally, we show the growth of MNC affiliates increases with stronger host country law and order tradition and institutions. Although previous research has shown that increases in law and order and financial market development benefit domestic firms, thus potentially creating stronger local competitors, we find MNC affiliates also benefit. The advantages of the MNC form of organization thus do not seem to be driven primarily by comparative advantage in access to financial capital.

References

Allen, F. and D. Gale. 2000. Financial Contagion, *Journal of Political Economy*, 108(1) 1-33.

Baldwin, R. 1988. Hysteresis in Import Prices: The Beachhead Effect, American Economic Review, 78(4): 773-785.

Buckley, Peter, and Casson, Marc. 1976. *The Future of the MNC.* New York: Holmes & Meier.

Caves, R.E. 1982 . *Multinational Enterprise and Economic Analysis*. London: Cambridge University Press.

Clague, Christopher: Philip Keefer, Stephen Knack and Mancur Olson, 1996, Property and Contract Rights Under Democracy and Dictatorship, *Journal of Economic Growth*, 1, 243-276.

Coase, R. 1937. The nature of the firm, *Economica*, 4: 386-405.

Demirguc-Kunt, Asli, and Vojislav Maksimovic, 1998, Law, Finance, and Firm Growth, *Journal of Finance* 53, (1998) 2107-2137.

Dixit, A. 1989. Hysteresis, Import Penetration, and Exchange-Rate Pass-Through, *Quarterly Journal of Economics*, 2: 205-228.

Dunning, John. 1973. The determinants of international production, *Oxford Economic Papers*, 25: 289-336.

Errunza, V.R. and Senbet, L.W. 1981. The effects of international operations on the market value of the firm: Theory and Evidence, *Journal of Finance*, 36: 401-417.

Errunza, V.R. and Senbet, L.W. 1984. International Corporate diversification, market valuation, and size-adjusted evidence, *Journal of Finance*, 39: 727-743.

Fazzari, Hubbard, G. and Peterson. 1988. Financing Constraints and Corporate Investment, *Brookings Papers on Economic Activity*, 145-195.

Helpman, E. 1984. A simple theory of international trade with multinational corporations, *Journal of Political Economy*, 92: 451-471.

Kim, W.S. and Lyn, E.O. 1986. Excess market value, the multinational corporation, and Tobin's q ratio, *Journal of International Business Studies*, 17: 119-126.

LaPorta, Rafael, Florencio Lopez de-Silanes, Andrei Shleifer and Robert W. Vishny, 1997, Legal Determinants of External Finance, *Journal of Finance*, 52, 1131-1150.

Lucas, R. On the size distribution of firms, *Bell Journal of Economics*, 9: 508-523.

Maksimovic, V. and Phillips, G. 1998. Asset Efficiency and Reallocation Decisions of Bankrupt Firms, *Journal of Finance*, 53(3): 1495.

Maksimovic, V. and Phillips, G. 1998. Do Conglomerate firms allocate resources efficiently? *Working paper*.

Morck, R. and Yeung, B. 1991. Why Investors Value Multinationality, *Journal of Business*, April: 165-188.

OECD, 1999. *Measuring Globalisation: The role of Multinationals in OECD Economies*. Paris, France: OECD.

Rajan, Raghuram G. and Luigi Zingales, 1998, Financial Dependence and Growth, *American Economic Review*, June, 559-586.

Rugman, A. 1981. *Inside the Multinationals: The Economics of Internal Markets*. London: Croom Helm.

Turner, Anthony and Golub, Stephen. 1997. Towards a system of multilateral unit labor cost-based competitiveness indicators for advanced, developing and transition economies, *International Monetary Fund*, working paper 97-151.

Vernon, R. 1971. *Sovereignty at Bay: The multinational spread of US Enterprises*. New York: Basic Books.

Wheeler, D. and Mody, A. 1992. International Investment Location Decisions: The case of US Firms, *Journal of International Economics*, 33: 57-76.

Williamson, O.E. 1975. *Markets and Hierarchies*. New York: Free Press.

Table 1
Variable Definitions, Summary Statistics and Expected Signs

Measure	Mean	St. Dev.	Exp. Sign
Log change in affiliate employment(t-(t-1))	-0.0003	0.3378	
[(Affiliate sales - CGS)/affiliate employment](t-1)	52.5204	414.5774	
[Affiliate efficiency - (average efficiency of all affiliates of the same US parent in the same industry as affiliate i)](t-1)	0.3255	76.6764	+
[Affiliate efficiency - (average efficiency of all affiliates in the same country and industry as affiliate i)](t-1)	0.4189	85.4423	+
Log change in real trade-weighted CPI-based exchange rate(t-(t-1))	-0.0010	0.0907	-
Log change in real GDP(t-(t-1))	0.0548	0.1256	+
Log change in real GDP((t-1) - (t-5))	0.1896	0.2754	+
(Weighted average efficiency of all affiliates of the same parent as affiliate i - Efficiency of affiliate i)(t-1)	4.1237	45.6632	+
Log sales of affiliate i(t-1)	10.5545	1.2266	
Interactions			
[Affiliate Efficiency (MNC-ind-year)*Number of affiliates of the same parent as affiliate i *Affiliate i's exchange rate shock(t-1)	16.4464	719.6070	-
[(Affiliate i's sales to US parents and to other affiliates of the same parent)/affiliate i's total sales]*Affiliate i's exchange rate shock](t-1)	-0.0001	0.0162	-
[Affiliate i's purchases from its US parent/affiliate i's total sales] *Affiliate i's exchange rate shock(t-1)	-0.0002	0.0171	+

Table 2

Descriptive Statistics by affiliate growth quartile

	Quartile 1 (lowest growth)	Quartile 2	Quartile 3	Quartile 4 (highest growth)	t-test (Ho: Q1 = Q4)
Affiliate growth (log change in empt.)	-0.156 (0.478)	-0.016 (0.173)	0.028 (0.196)	0.146 (0.362)	61.221 (0.000)
Affiliate Efficiency (by MNC, industry)	-1.686 (82.215)	-0.283 (65.201)	0.123 (64.138)	3.348 (94.093)	4.883 (0.000)
Affiliate Efficiency (by country, industry)	-2.751 (90.703)	-1.084 (77.606)	-0.743 (71.186)	6.781 (101.639)	8.481 (0.000)
Affiliate Employment	462.740 (1387.94)	684.781 (1796.42)	581.598 (1297.67)	474.472 (1175.93)	0.784 (0.250)
Affiliate Sales	131672 (760579.30)	154232.7 (587239.60)	111371.4 (386167.00)	85728.1 (197570.50)	-7.16 (0.000)
Parent Sales	7990208 (15500000)	7263578 (13500000)	6783936 (12900000)	7769890 (15300000)	-1.223 (0.250)
Parent growth (log change in empt.)	0.010 (0.445)	0.015 (0.622)	0.024 (0.560)	0.043 (0.479)	6.135 (0.000)
Parent efficiency*	204.287 (413.971)	207.425 (488.013)	203.406 (504.991)	241.459 (473.186)	7.165 (0.000)
Other affiliate efficiency	1.886 (42.779)	3.546 (48.203)	3.453 (41.476)	7.891 (49.846)	11.077 (0.000)
Parent R&D	297404 (744734)	284771 (674181)	293105 (665332)	313636 (812914)	1.785 (0.100)
Observations	15036	16395	16787	14430	

*Note: Parent efficiency is defined here as (parent sales - parent employee compensation)/parent employment

Standard deviations in parentheses

Table 3A
Affiliate Growth of U.S. MNCs

Table presents regressions of affiliate growth in employment in response to efficiency and exchange rate shocks. All efficiency variables are year adjusted. Affiliate efficiency is a labor-value added measure. It is calculated as affiliate sales minus cost of goods sold divided by affiliate employment all lagged one year and is industry-year adjusted. MNC export integration is the percentage of the affiliates sales exported to the MNC parent and its affiliates. Import integration is the percentage of affiliate sales imported from its U.S. parent. Exchange rate (GDP) shock is the log change in year-end exchange rates (GDP). Trend is a time trend. All regressions contain random firm effects and country dummy variables. (Standard errors are in parentheses.)

	Affiliate Growth
Efficiency - relative MNC-industry-year	0.1608 [a]
	(0.0286)
Efficiency - relative country-industry-year	0.1709 [a]
	(0.0255)
Efficiency of US parent	0.0692 [a]
	(0.0150)
Efficiency of other affiliates in the MNC	0.1248 [a]
	(0.0357)
Relative Efficiency (MNC-Ind-Year)*Number of affiliates in MNC*Exchange rate shock	-0.0045 [b]
	(0.0020)
MNC Export Integration*Exchange rate shock	-0.3536 [a]
	(0.0883)
MNC Import Integration*Exchange rate shock	-0.0721
	(0.0887)
Log sales	-0.0364 [a]
	(0.0020)
Trend	-0.0031 [a]
	(0.0004)
Exchange rate shock	0.0189
	(0.0180)
GDP shock	0.1810 [a]
	(0.0512)
Long-run (5-year) GDP growth	0.1331 [a]
	(0.0252)
Constant	0.3654 [a]
	(0.0216)
σ_u	0.2343
σ_ε	0.2903
ρ	0.3943
R-Square	0.0094
Number of Observations	51198
Number of Affiliates	12017

*Notes: a = significant at the 1% level, b = significant at the 5% level, c = significant at the 10% level.
Countries in the sample include: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, U.K., Venezuela.

Table 3B
Parent Growth of U.S. MNCs

Table presents regressions of MNC parent growth in employment in response to efficiency and exchange rate shocks. All efficiency variables are year adjusted and are for time t-1. Efficiency is a labor-value added measure. It is calculated as sales minus cost of goods sold divided by employment all lagged one year and is industry-year adjusted. MNC export (import) integration is the percentage of the parent's sales from (sales to) its affiliates. adjusted. Exchange rate (GDP) shock is the log change in year-end exchange rates (GDP). Trend is a time trend. Regression is estimated using an unbalanced panel with random firm effects and country dummy variables. (Standard errors are in parentheses.)

	Parent Growth
Efficiency of affiliate network	0.2690 [a]
	(0.0704)
Efficiency of US Parent	0.1110 [a]
	(0.0213)
Parent Efficiency*Number of affiliates	-0.0017
in MNC*Exchange Rate shock	(0.0263)
Parent-Export Integration*Exchange rate shock	-1.8056
	(1.2036)
Parent-Import Integration*Exchange rate shock	3.1759 [b]
	(1.7052)
Parent R&D/Sales	0.0675 [b]
	(0.0391)
Log Parent Sales	-0.0057 [a]
	(0.0017)
US Exchange Rate Shock	0.0183
	(0.1025)
GDP shock	-0.0709
	(0.2108)
Long-run (5 year) US GDP growth	-0.0993
	(0.1317)
Trend	-0.0002
	(0.0013)
Constant	0.0900 [a]
	(0.0267)
σ_u	0.0653
σ_ε	0.1550
ρ	0.1509
R-Square	0.0108
Number of Observations	5342
Number of Parents	1470

*Notes: a = significant at the 1% level, b = significant at the 5% level, c = significant at the 10% level.

Table 4:
Affiliate Growth and Export/Import Integration

Table presents regressions of affiliate growth in employment in response to efficiency and exchange rate shocks by high and low export/import intensity. High (low) intensity are the top (bottom) two quartiles of firms ranked by export and import integration. MNC export integration is the percentage of the affiliates sales exported to the MNC parent and its affiliates. Import integration is the percentage of affiliate sales imported from its U.S. parent. All efficiency variables are year adjusted. Affiliate efficiency is a labor-value added measure. It is calculated as affiliate sales minus cost of goods sold divided by affiliate employment all lagged one year and is industry-year adjusted. Exchange rate (GDP) shock is the log change in year-end exchange rates (GDP). Trend is a time trend.
All regressions contain random firm effects and country dummy variables. (Standard errors are in parentheses.)

	Model 1: Low MNC Export Intensity	Model 2: High MNC Export Intensity	Model 3: Low MNC Import Intensity	Model 4: High MNC Import Intensity
Affliiate Efficiency - relative to affiliates	0.1950 [a]	0.1665 [a]	0.1797 [a]	0.1498 [a]
of same MNC (industry - year adjusted)	(0.0442)	(0.0352)	(0.0404)	(0.0420)
Affiliate Efficiency - relative to other MNC	0.1630 [a]	0.1846 [a]	0.1299 [a]	0.2339 [a]
affiliates within the same country	(0.0386)	(0.0324)	(0.0357)	(0.0383)
Efficiency of US parent	0.0927 [a]	0.0415 [b]	0.0684 [a]	0.0677 [a]
	(0.0237)	(0.0183)	(0.0236)	(0.0183)
Efficiency of other affiliates in the MNC	0.1247 [b]	0.1218 [a]	0.0838	0.1791 [a]
	(0.0534)	(0.0458)	(0.0546)	(0.0453)
Relative Efficiency (MNC-Ind-Year)*Number	-0.0053	-0.0046 [b]	-0.0037	-0.0057 [b]
of affiliates in MNC*Exchange rate shock	(0.0037)	(0.0022)	(0.0034)	(0.0024)
MNC Export Integration*Exchange rate shock	-0.6038	-0.3079 [a]	-0.1397	-0.4364 [a]
	(0.5310)	(0.0834)	(0.1867)	(0.0893)
MNC Import Integration*Exchange rate shock	0.0443	-0.1908 [c]	0.5107	0.0204
	(0.1447)	(0.1071)	(0.4639)	(0.0827)
Log sales	-0.0533 [a]	-0.0234 [a]	-0.0397 [a]	-0.0282 [a]
	(0.0034)	(0.0021)	(0.0032)	(0.0021)
Trend	-0.0035 [a]	-0.0025 [a]	-0.0031 [a]	-0.0023 [a]
	(0.0008)	(0.0005)	(0.0008)	(0.0005)
Exchange rate shock	0.0405	-0.0032	0.0458	-0.0206
	(0.0273)	(0.0233)	(0.0321)	(0.0202)
GDP shock	0.2082 [b]	0.1480 [b]	0.1389	0.2077 [a]
	(0.0843)	(0.0604)	(0.0911)	(0.0576)
Long-run (5-year) GDP growth	0.1375 [a]	0.1303 [a]	0.1748 [a]	0.1082 [a]
	(0.0422)	(0.0296)	(0.0453)	(0.0283)
Constant	0.5312 [a]	0.2270 [a]	0.3984 [a]	0.2752 [a]
	(0.0366)	(0.0237)	(0.0356)	(0.0232)
σ_u	0.3239	0.1668	0.3050	0.1621
σ_ε	0.3115	0.2508	0.3314	0.2444
ρ	0.5195	0.3066	0.4586	0.3056
R-Square	0.0103	0.012	0.0093	0.014
Number of Observations	22295	28903	21301	29897
Number of Affiliates	7495	7080	7413	7058

*Notes: a = significant at the 1% level, b = significant at the 5% level, c = significant at the 10% level.

Table 4B

Affiliate Growth for Both Import and Export Intensity

Table presents regression results for affiliate growth in employment for firms which rank in both the highest (lowest) two quartiles of export and import intensity. Variables are defined in Table 4A. Regressions are estimated using a random effects panel estimator allowing for an unbalanced panel. All regressions also contain unreported country fixed effects. (Standard errors are in parentheses.)

	Model 5: Low MNC Export and Import Intensity	Model 6: High MNC Export and Import Intensity
Efficiency - relative MNC-industry-year	0.2000 [a]	0.1686 [a]
	(0.0545)	(0.0507)
Efficiency - relative country-industry-year	0.1294 [a]	0.2242 [a]
	(0.0474)	(0.0461)
Efficiency of US parent	0.1087	0.0728 [a]
	(0.0307)	(0.0217)
Efficiency of other affiliates in the MNC	0.0732	0.1528 [a]
	(0.0683)	(0.0559)
Relative Efficiency (MNC-Ind-Year)*Number of affiliates in MNC*Exchange rate shock	-0.0058	-0.0079 [a]
	(0.0047)	(0.0026)
MNC Export Integration*Exchange rate shock	-0.0960	-0.3559 [a]
	(0.9011)	(0.0933)
MNC Import Integration*Exchange rate shock	0.5314	-0.1536
	(0.6918)	(0.1085)
Log sales	-0.0553 [a]	-0.0244 [a]
	(0.0044)	(0.0023)
Trend	-0.0039 [a]	-0.0029 [a]
	(0.0011)	(0.0005)
Exchange rate shock	0.0389	-0.0300
	(0.0385)	(0.0251)
GDP shock	0.1885	0.2017 [a]
	(0.1162)	(0.0667)
Long-run (5-year) GDP growth	0.1217 [b]	0.0849 [a]
	(0.0586)	(0.0329)
Constant	0.5596 [a]	0.2414 [a]
	(0.0481)	(0.0262)
σ_u	0.3840	0.1609
σ_ε	0.3310	0.2337
ρ	0.5737	0.3215
R-Square	0.0109	0.0147
Number of Observations	13987	21589
Number of Affiliates	5371	5435

*a = significant at the 1% level, b = significant at the 5% level, c = significant at the 10% level.

Table 5:
MNC Integration and Financial Market Development

Table tests the effect of stock market turnover times the number of companies traded on the growth in affiliate employment. Stock market turnover is the dollar volume traded divided by stock market capitalization. The regressions are run for both high and low export/import intensity, where high (low) intensity are the top (bottom) two quartiles of firms ranked by export and import integration. MNC export integration is the percentage of the affiliates sales exported to the MNC parent and its affiliates. Import integration is the percentage of affiliate sales imported from its U.S. parent. All efficiency variables are year adjusted. Affiliate efficiency is a labor-value added measure. It is calculated as affiliate sales minus cost of goods sold divided by affiliate employment all lagged one year and is industry-year adjusted.
Exchange rate (GDP) shock is the log change in year-end exchange rates (GDP). Trend is a time trend.
All regressions contain random firm effects and country dummy variables. (Standard errors are in parentheses.)

	Model 1: Low MNC Export and Import Intensity	Model 2: High MNC Export and Import Intensity
Efficiency - relative MNC-industry-year	0.1839 [a]	0.2318 [a]
	(0.0562)	(0.0525)
Efficiency - relative country-industry-year	0.1359 [a]	0.2588 [a]
	(0.0490)	(0.0476)
Efficiency of US parent	0.1088 [a]	0.0672 [a]
	(0.0311)	(0.0218)
Efficiency of other affiliates in the MNC	0.0805	0.1793 [a]
	(0.0702)	(0.0604)
Relative Efficiency (MNC-Ind-Year)*Number of affiliates in MNC*Exchange rate shock	-0.0053	-0.0099 [a]
	(0.0047)	(0.0026)
MNC Export Integration*Exchange rate shock	0.7212	-0.3555 [a]
	(0.9326)	(0.0954)
MNC Import Integration*Exchange rate shock	0.5323	-0.1212
	(0.6951)	(0.1100)
Log sales	-0.0550 [a]	-0.0241 [a]
	(0.0044)	(0.0023)
Trend	-0.0043 [a]	-0.0032 [a]
	(0.0012)	(0.0006)
Market Turnover*Companies Traded	0.0137	0.0242 [a]
	(0.0153)	(0.0078)
Exchange rate shock	0.0282	-0.0343
	(0.0394)	(0.0253)
GDP shock	0.1603	0.1818 [a]
	(0.1176)	(0.0671)
Long-run (5-year) GDP growth	0.1274 [b]	0.0789 [b]
	(0.0590)	(0.0330)
Constant	0.5538 [a]	0.2327 [a]
	(0.0489)	(0.0264)
σ_u	0.3840	0.1599
σ_ε	0.3304	0.2326
ρ	0.5747	0.3208
R-Square	0.0108	0.0166
Number of Observations	13610	21056
Number of Affiliates	5271	5336

*Notes: a = significant at the 1% level, b = significant at the 5% level, c = significant at the 10% level.

Table 6

Financial Market Development and Law and Order

Table tests the effect of a countries legal tradition on the growth in affiliate employment in low and high stock market capitalization. Law and order is from IRIS and is an annual measure ranging from 0 to 6. Low (high) stock market capitalization are the two bottom (top) quartiles of stock market capitalization / GDP. MNC export integration is the percentage of the affiliates sales exported to the MNC parent and its affiliates. Import integration is the percentage of affiliate sales imported from its U.S. parent. All efficiency variables are year adjusted. Affiliate efficiency is a labor-value added measure. It is calculated as affiliate sales minus cost of goods sold divided by affiliate employment all lagged one year and is industry-year adjusted. Exchange rate (GDP) shock is the log change in year-end exchange rates (GDP). Trend is a yearly time trend. All regressions contain random firm effects. (Standard errors are in parentheses.)

	Model 1: Low Market-Capitalization Countries	Model 2: High Market-Capitalization Countries
Efficiency - relative MNC-industry-year	0.1613 [a]	0.1600 [a]
	(0.0526)	(0.0372)
Efficiency - relative country-industry-year	0.1352 [b]	0.1665 [a]
	(0.0565)	(0.0307)
Efficiency of US parent	0.0539 [b]	0.0666 [a]
	(0.0275)	(0.0192)
Efficiency of other affiliates in the MNC	0.1430 [b]	0.1023 [b]
	(0.0684)	(0.0446)
Relative Efficiency (MNC-Ind-Year)*Number of affiliates in MNC*Exchange rate shock	0.0024	-0.0061 [b]
	(0.0035)	(0.0025)
MNC Export Integration*Exchange rate shock	-0.3184 [b]	-0.4106 [a]
	(0.1499)	(0.1360)
MNC Import Integration*Exchange rate shock	-0.1599	0.0865
	(0.1581)	(0.1258)
Log sales	-0.0296 [a]	-0.0269 [a]
	(0.0033)	(0.0022)
Trend	-0.0043 [a]	-0.0024 [a]
	(0.0009)	(0.0006)
Law and Order	0.0057 [b]	-0.0034
	(0.0030)	(0.0028)
Exchange rate shock	0.0218	0.0107
	(0.0240)	(0.0306)
GDP shock	-0.0167	0.3452 [a]
	(0.0763)	(0.0771)
Long-run (5-year) GDP growth	0.2381 [a]	0.1017 [a]
	(0.0352)	(0.0333)
Constant	0.2901 [a]	0.2955 [a]
	(0.0356)	(0.0274)
σ_u	0.2161	0.1977
σ_ε	0.2712	0.2991
ρ	0.3884	0.3041
R-Square	0.0087	0.0077
Number of Observations	14511	31472
Number of Affiliates	4423	8705

*a = significant at the 1% level, b = significant at the 5% level, c = significant at the 10% level.

Table 7

Financial Market Development and Law and Order

Table tests the effect of stock market turnover times the number of companies traded on the growth in affiliate employment for high/low law and order countries. Stock market turnover is the dollar volume traded divided by stock market capitalization. The regressions are run for both high and low law and order countries, where low (high) law and order are the top (bottom) two quartiles of countries ranked by IRIS law and order tradition in each year. MNC export integration is the percentage of the affiliates sales exported to the MNC parent and its affiliates. Import integration is the percentage of affiliate sales imported from its U.S. parent. All efficiency variables are year adjusted. Affiliate efficiency is a labor-value added measure. It is calculated as affiliate sales minus cost of goods sold divided by affiliate employment all lagged one year and is industry-year adjusted. Exchange rate (GDP) shock is the log change in year-end exchange rates (GDP). Trend is a time trend. All regressions contain random firm effects and country dummy variables. (Standard errors are in parentheses.)

	Model 1: Low Rule of Law Countries	Model 2: High Rule of Law Countries
Efficiency - relative MNC-industry-year	0.1979 [a]	0.1318 [a]
	(0.0469)	(0.0423)
Efficiency - relative country-industry-year	0.2276 [a]	0.1584 [a]
	(0.0461)	(0.0347)
Efficiency of US parent	0.0753 [a]	0.0559 [b]
	(0.0230)	(0.0222)
Efficiency of other affiliates in the MNC	0.1337 [b]	0.0962 [c]
	(0.0555)	(0.0536)
Relative Efficiency (MNC-Ind-Year)*Number of affiliates in MNC*Exchange rate shock	0.0003	-0.0084 [a]
	(0.0026)	(0.0033)
MNC Export Integration*Exchange rate shock	-0.2807 [b]	-0.5377 [b]
	(0.1125)	(0.2172)
MNC Import Integration*Exchange rate shock	0.0371	0.0030
	(0.1107)	(0.1920)
Log sales	-0.0346 [a]	-0.0259 [a]
	(0.0028)	(0.0026)
Trend	-0.0044 [a]	-0.0037 [a]
	(0.0008)	(0.0008)
Market Turnover*Companies Traded	-0.0139 [c]	0.0345 [a]
	(0.0084)	(0.0126)
Exchange rate shock	-0.0099	0.0368
	(0.0208)	(0.0458)
GDP shock	0.1730 [b]	0.1633 [b]
	(0.0791)	(0.0759)
Long-run (5-year) GDP growth	0.2162 [a]	0.0990 [b]
	(0.0406)	(0.0420)
Constant	0.3304 [a]	0.2475 [a]
	(0.0646)	(0.0289)
σ_u	0.2368	0.2087
σ_ε	0.2708	0.2968
ρ	0.4334	0.3308
R-Square	0.012	0.009
Number of Observations	22765	22674
Number of Affiliates	6527	6997

*a = significant at the 1% level, b = significant at the 5% level, c = significant at the 10% level.

Table 8

Financial Market Development Dynamics

Table tests the effect of changes in stock market capitalization (divided by GDP) on the growth in affiliate employment. We calculate the change in stock market capitalization over a 12 year period. The regressions are for firms in high (low) growth countries that began the 1983-1985 period with low (high) initial stock market capitalization / GDP. High (low) are the top (bottom) two quartiles of these variables. MNC export integration is the percentage of the affiliates sales exported to the MNC parent and its affiliates. Import integration is the percentage of affiliate sales imported from its U.S. parent. All efficiency variables are year adjusted. Affiliate efficiency is a labor-value added measure. It is calculated as affiliate sales minus cost of goods sold divided by affiliate employment all lagged one year and is industry-year adjusted.
Exchange rate (GDP) shock is the log change in year-end exchange rates (GDP). Trend is a time trend.
All regressions contain random firm effects and country dummy variables. (Standard errors are in parentheses.)

	Model 1: High Growth/ Low Initial Development Countries	Model 2: Low Growth/ High Initial Development Countries
Efficiency - relative MNC-industry-year	0.1079 [b]	0.1616 [a]
	(0.0612)	(0.0358)
Efficiency - relative country-industry-year	0.2538 [a]	0.1568 [a]
	(0.0702)	(0.0292)
Efficiency of US parent	0.0245	0.0827 [a]
	(0.0317)	(0.0183)
Efficiency of other affiliates in the MNC	0.1826 [b]	0.1042 [b]
	(0.0759)	(0.0437)
Relative Efficiency (MNC-Ind-Year)*Number of affiliates in MNC*Exchange rate shock	-0.0022	-0.0057 [b]
	(0.0038)	(0.0025)
MNC Export Integration*Exchange rate shock	-0.4470 [a]	-0.3090 [b]
	(0.1269)	(0.1326)
MNC Import Integration*Exchange rate shock	-0.0966	0.0238
	(0.1573)	(0.1234)
Log sales	-0.0503 [a]	-0.0303 [a]
	(0.0048)	(0.0022)
Trend	-0.0025	-0.0030 [a]
	(0.0009)	(0.0005)
Exchange rate shock	0.0373	0.0094
	(0.0276)	(0.0276)
GDP shock	0.1298	0.2643 [a]
	(0.1108)	(0.0678)
Long-run (5-year) GDP growth	0.2149 [a]	0.0857 [a]
	(0.0496)	(0.0334)
Constant	0.3365 [a]	0.3050 [a]
	(0.0780)	(0.0245)
σ_u	0.3013	0.2085
σ_ε	0.2695	0.2980
ρ	0.5557	0.3286
R-Square	0.0104	0.0083
Number of Observations	11680	34118
Number of Affiliates	2677	7855

*a = significant at the 1% level, b = significant at the 5% level, c = significant at the 10% level.
Countries in the High-growth sample include: Argentina, Austria, Colombia, Finland, France, Greece, India, Indonesia, Korea, Mexico, Peru, Philippines, Portugal, Spain, Thailand, Turkey. The low-growth sample includes: Australia, Belgium, Brazil, Canada, Denmark, Germany, Hong Kong, Israel, Japan, Netherlands, New Zealand, Singapore, South Africa, Sweden, Switzerland, and the U.K.